



STATE OF UTAH  
NATURAL RESOURCES  
Oil, Gas & Mining

*File*  
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May 16, 1988

Ms. M. S. Litus  
Environmental Engineer  
Tenneco Minerals  
P.O. Box 1167  
Green River, Wyoming 82935

Dear Ms. Litus:

Re: Review of Operator Deficiency Response to Original Notice of Intention to Commence Large Mining Operations, Tenneco Minerals Company, Goldstrike Project, M/053/005, Washington County, Utah

The Division has completed its review of your latest April 4, 1988 resubmittal for the proposed Goldstrike mining project. This letter contains the hydrology portions which were not contained in our review letter dated May 6, 1988. For your convenience, we have included the May 6th review comments into this letter as well.

Summary of Second Review:

Item III-12, pages 23-26, - Toxic Materials:

1. The initial areas of concern have been addressed adequately under this section. The operator has committed to performing an acid-base potential analysis on the sulfide ore that will be generated as waste material, during the course of mining. The analysis will be sent into the Division, when complete, and incorporated into the plan as Appendix E.

Item III-3, pages 3-17, Hydrology

1. On page 8 of the revised submission, the operator has proposed to utilize a filter fabric between the riprap and the soil substrate in lieu of an aggregate filter blanket. This is an acceptable although less preferred alternative. The overall effectiveness of a filter fabric, when used in place of an aggregate filter blanket, is dependent upon the attention given to insure that proper preparation of the channel base is maintained and that field personnel are well trained and/or closely supervised in the actual installation of the fabric according to the manufacturer's specifications.

Proper placement of the riprap to avoid the possibility of puncturing or tearing of the fabric is also important. A subbase layer of appropriately-sized gravel beneath the well-graded riprap is suggested to help "cushion the filter fabric and lessen the likelihood of holes or tears occurring.

2. The operator has addressed the question regarding the sizing of the reaches to be used at final reclamation on page 40 of the revised plan. All diversions that are not scheduled to be removed during final regrading activities will be sized for the 100 year 24 hour storm event.
3. The operator describes, on page 9, that the combined capacity of the leach ponds will contain the maximum operating water and solution inventory, plus the runoff from the 10 year 24 hour storm event. Any excess drainage will be routed to the mine impoundment. It is assumed this overflow drainage would be contaminated with solution from the leach ponds. If this is the case, the channels and sediment pond would also have to be appropriately designed to contain cyanide wastes.

On May 2, 1988, Holland Shepherd of the Division spoke with Marty Litus of Tenneco regarding this question. Ms. Litus indicated that the operator was planning to increase the size of the three leach pad ponds to meet the 100 year 24 hour event, criteria. No leachate or drainage from the leach pads or leach ponds will discharge to the mine impoundment for any event less than or equal to the 100 year 24 hour storm. The operator will need to provide revised plans addressing these sizing design changes.

In addition to amending the text to reflect the change in pond sizing, the Division requests revised design drawings, sizing calculations and stage storage capacity curves for the leach ponds and the mine impoundment. The stage capacity curves should indicate, as appropriate, the maximum operational water level, the projected solution inventory level, and the 10 year and 100 year 24 hour storm volume runoff levels.

4. The operator indicates in the April 4, 1988 resubmittal, that during operations, the leach ponds are designed to contain the 100 year 24 hour runoff volume (4.6 AF) from drainages 4, 7 and 8. The mine impoundment is designed to contain the runoff volume from all other contributing areas (20.8 AF) plus the 3-year sediment volume (0.5 AF). Upon final reclamation the leach ponds will have been eliminated, removing any extra retention capacity. This leaves the mine impoundment to handle sediment loading and runoff for the entire mine site. No post-mining reclamation hydrology calculations have been made. Drainage from the post-mining reclaimed area has not been

calculated by the Division, but it would likely be similar to the 25.4 AF (100 year 24 hour) volume determined for the operational phase.

On May 2, 1988, Ms. Litus indicated to Mr. Shepherd that the operator had not taken into account post-mining pond sizing when preparing the application. Post-mining hydrologic calculations should be prepared to reevaluate the capacity of the impoundment to adequately contain the maximum design storm runoff and sediment volume from the regraded minesite.

The operator indicates in the April 4th response that the mine impoundment will be periodically cleaned out during the operational phase of the mine. The operator should also commit to sediment removal upon final reclamation to reestablish the sediment storage volume of the impoundment.

5. It is the Division's opinion that during the first two years following reclamation, the site will be more exposed to erosion and that it will be important to retain excess sediment onsite. In the long term the revegetation efforts will stabilize the site and the need for supplemental sediment control will not be as great.

The Division recommends that the operator evaluate the post-mining runoff hydrology for the minesite. Supplemental temporary runoff and erosion control measures should be utilized upon final reclamation and remain in effect until vegetation is reestablished and the site is stabilized.

6. The operator has indicated that temporary sediment control structures (i.e., silt-fences), will be used where necessary to control erosion during operations. The surface drainage map, drawing no. GS-012, shows several proposed locations for silt-fences. It is suggested that the operator also utilize temporary sediment control measures around the base of the topsoil stockpiles until the proposed vegetative cover crop becomes established.

This commitment should be added to the plan as revised text and/or as a revision to drawing GS-012.

7. The operator has not indicated the emergency drainage design plan for the leach ponds or the mine impoundment. The text should be revised and detailed drawings provided outlining the emergency overflow provisions which will be incorporated into the design of these structures. The ponds and impoundment must include designed nonerodible emergency spillways which will safely pass any excess discharge in excess of the design storm.

8. The Division will defer to the State Department of Health, Bureau of Water Pollution Control (BWPC) for the specific final design requirements for the leach pad configurations, the solution ponds, leak detection system, and ground water monitoring plan, as required. In this regard, the operator must provide any updated design changes and plans that are required and approved by the BWPC to this office to amend the application.
9. The operator should describe what procedures would be followed in the event that a serious leak(s) developed in a leach pond liner(s) which required an immediate emergency repair.
10. The operator indicates that upon decommissioning of the site, the solution ponds will be tested for cyanide content and neutralized with sodium hypochlorite. After evaporation, the pond liners will be folded and buried in the pond basin with the concrete foundations and other nonsalvageable equipment. No commitment to analyse any residual evaporite has been made prior to burial of the liners.

The Division requests that the operator provide a commitment to analyse any residual evaporites which remain in the solution ponds upon final reclamation. The analyses to be performed and disposal techniques required will be determined upon final reclamation according to the applicable state and/or federal standards that are in effect at that time.

Section V, pages 35-40, - Reclamation:

1. The operator has adequately addressed Division concerns regarding final reclamation slope gradients on the leach pads, waste dumps, and leach pad foundation. However, upon final reclamation, most of the proposed hillside slopes will be some 200 feet in length with no breaks. The Division suggests that the operator leave contours or setbacks on the leach pad slopes, upon final reclamation. This would reduce the erosion potential of the exposed hillsides.
2. During a recent phone conversation between Mr. Shepherd of the Division and Ms. Litus, the topic of hydromulching the steeper slopes at the minesite, was discussed. It was agreed that if hydromulching was to be used, that it should be applied in a two step process; by seeding first, then applying the mulch, tackifier and fertilizer. This commitment will need to be made part of the reclamation plan.

Item VII, page 41, - Surety Estimate:

The regrading, topsoiling, and revegetation cost estimates are adequate. It is our understanding that the Bureau of Water Pollution Control (BWPC) may require additional analysis and testing than what is described in Tenneco's decommissioning estimate. Please review the decommissioning details with Charlie Dietz of BWPC and update the estimate as necessary. Please provide this office with a copy of any revised decommissioning estimates.

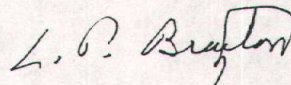
General Comments - Reclamation Plan

Enclosed with this review are two application forms from the State Division of Water Rights, Dam Safety Section. Form R-69, is intended for impoundments which will contain less than 20 AF of water. This form may be applicable for the leach area solution ponds. The second form, Permit Application to Alter a Natural Channel in the State of Utah, should apply to the proposed plans to divert portions of Quail Creek. These forms should be completed and forwarded to the Division of Water Rights, in care of Mr. Richard Hall, Dam Safety Section.

Detailed designs for impoundments exceeding 20 AF in size are usually required by Dam Safety. The operator is advised to contact Mr. Hall or Mr. John Mann directly regarding the proposed mine impoundment designs. Any design changes required and approved by Dam Safety must also be provided by the operator to the Division to update the application.

Please format any updated information so that we can insert it directly into the current permit application as replacement pages. This practice will ensure that we will both have a workable and readable plan for future reference. Again, thank you for your cooperation and patience. Please contact me or Holland Shepherd should you have any questions or concerns with this review document.

Sincerely,



L. P. Braxton  
Administrator  
Mineral Resource Development  
and Reclamation Program

WH

cc: M. Stairwalt, Tenneco, St. George  
F. Rowley, BLM, Cedar City  
C. Dietz, BWPC  
R. Hall, Dam Safety

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